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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

June 5, 1992

Ms. Donna R. Searcy
Secretary
Federal Communications Commission
1919 M Street, N.W.
Room 222
Washington, D.C. 20554

Subject: ET Docket No. 92-9 - Redevelopment of Spectrum
to Encourage Innovation in the Use of New
Telecommunications Technologies - Proposed Rule

Dear Ms. Searcy:

In response to the Notice of Proposed Rulemaking referenced above, which was published in the Federal Register (57 FR 5993) of February 19, 1992, the Interstate Natural Gas Association of America (INGAA) wishes to provide the following comments.

INGAA is a non-profit national trade association representing virtually all of the major interstate natural gas transmission companies operating in the United States and interprovincial pipelines operating in Canada. INGAA's members operate over 200,000 miles of pipelines and related facilities, and account for over 90 percent of all natural gas transported and sold in interstate commerce. Our members own and operate private fixed microwave facilities over much of the United States and on the Outer Continental Shelf. Most of these facilities currently operate in the 1850 to 2200 MHz (2 GHz) band the FCC is proposing to set aside for emerging telecommunications technologies. Therefore, our members have a vital operational and economic interest in this proposed rulemaking.

GENERAL

While our industry applauds the development of new communications technologies, we strongly object to the FCC's proposal to allocate the 1850 to 2200 MHz band to those technologies by forcing current users to relocate to other frequency bands or to other methods of communication.

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This microwave band is critical to the safe operation of a vast network of natural gas pipelines that provide approximately 25 percent of our nation's energy needs. That includes critical voice, data and telemetry circuits, such as the Supervisory Control and Data Acquisition (SCADA) circuits which are critical to pipeline operations, allowing operators to monitor pipeline pressures, temperatures, flow rates, and system loading. Control data are used to monitor and control unmanned and remote automated compressor stations as well as pipeline pressure and flow control valves. In addition, it is used extensively for field voice communications including off-premise telephone extensions to remote areas, telephone tie-lines between field office switchboards, radio remote control lines for dispatching emergency and maintenance personnel, electronic mail and gas measurement and meter data.

Critical problems would arise with the proposed relocation of fixed users of the 2 GHz band. In a pipeline system, signals are transmitted throughout a system that normally stretches thousands of miles. The current 2 GHz band allows for clear, strong, long-distance, reliable transmissions while other bands would require additional communication and relay facilities or are adversely affected by natural elements. The operation of pipeline systems is particularly dependent on reliable microwave telecommunications; the impracticability of manning all areas of the system mandates that portions be operated on a remote basis.

**THE COMMISSION DID NOT EXAMINE
ALL POTENTIAL SPECTRUM ALTERNATIVES**

The Commission conceded in Paragraphs 12 and 13 of the Notice that its consideration of candidate frequency bands was limited strictly to the 1-3 GHz range because of the belief that: (a) the availability of state-of-the-art technology for mobile equipment limits operations to frequencies under 3 GHz and, (b) the spectrum below 1 GHz does not offer contiguous spectrum availability sufficient to provide a location for new technologies.

This decision is apparently drawn from the January 1992 study performed by the Commission's Office of Engineering and Technology (OET) which focused its analysis on spectrum in the 1-3 GHz range and, within that range, concentrated its analysis on the bands 1850-1990 MHz, 2130-2150 MHz and 2160-2200 MHz. Consequently, the "actual range" of spectrum analyzed by the Commission is insufficient to provide it with the full scope of information necessary to arrive at a reasoned and informed spectrum choice in this proceeding. Accordingly, the technical premises underlying the Commission's choice of "reserve spectrum" are seriously flawed.

INGAA believes there is sufficient spectrum outside the 1-3 GHz range, as well as frequencies within the 1-3 GHz range other than those now targeted for reallocation, which meet the Commission's criteria. More importantly, this alternative spectrum may be made available as a new technology reserve without the serious negative consequences which the proposed reallocation will create.

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The Commission has shown no evidence either through the OET study or the Notice that mobile technology is incapable of using higher frequency ranges. It is well established that several private industry projects are underway which employ mobile operations above 3 GHz. For example, AT&T is working on PCS development in the higher range Common Carrier bands. Motorola now offers "data PCS" type services which operate in the band 17.7-19.7 GHz. Higher range frequencies are also used by the military to provide elements of their mobile service operations.

Further, frequencies below 1 GHz also hold promise for use by emerging technologies. It is an acknowledged fact that for low power transmission in urban environments, as is proposed for PCS and data-PCS, frequencies below 1 GHz provide more desirable propagation characteristics since they penetrate buildings, trees, leaded glass and other obstructions better than do frequencies in the 1-3 GHz range. Frequencies below 1 GHz will also efficiently meet the propagation needs for the other new services proposed.

The Commission's cursory dismissal of spectrum below the 1 GHz range due to a lack of sufficient contiguous spectrum availability and/or use for broadcasting exhibits a lack of serious analysis since, for example, two significant blocks of lightly used UHF-TV spectrum in the range 512-608 MHz and 614-806 MHz could offer an excellent spectrum home for new technologies. INGAA believes that, should the Commission remain persuaded that a large spectrum block must be dedicated solely to new technologies, a frequency analysis of significantly greater scope than that performed to date must be made. Such a study would allow the Commission to review all pertinent information before reaching a final conclusion in this proceeding. The Commission's unwillingness to consider accommodating new technologies in frequencies outside the 1-3 GHz range seems to be inconsistent with its legal obligation to consider all relevant factors before making a final decision (see *Citizen's to Preserve Overton Park, Inc. v. Volpe*, 401 U.S. 402, 91 S. Ct 814, 28 L.Ed 2d 136 (1971)).

Even assuming that, after careful consideration of all frequency possibilities, the Commission had determined that the 1-3 GHz range represented the ideal location for emerging technologies, the Commission's spectrum study would still be flawed. The study did not consider other bands within that 1-3 GHz range to fully evaluate spectrum choices which could provide efficient, cost-effective and less disruptive spectrum in which to accommodate new technologies. The Commission seems predetermined to identify the bands 1.85-1.99 GHz, 2.13-2.15 GHz, and 2.16-2.20 GHz as the optimal spectrum home for proposed new technologies. INGAA does not concur with the Commission's choice, since other bands within the 1-3 GHz frequency range could be made available faster, with less cost to incumbent users and new technology proponents, and with no harmful impact on the public welfare and safety.

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Based on cost of equipment, amount of spectrum, feasibility of relocation, and international developments, INGAA believes there are frequency bands reserved for use by the Federal Government that are currently underutilized and should be investigated as the first alternative for accommodating the needs of emerging technologies. If the FCC is not willing to wait and see if the government bands can provide additional spectrum for use by these emerging services, then INGAA believes the 2500-2690 MHz band would be a better focus for the spectrum reserve than the 1850-2200 MHz band.

The 2500-2690 MHz band is allocated domestically for the Multichannel Multipoint Distribution Service ("MMDS") and the Instructional Television Fixed Service ("ITFS"). This band is lightly loaded and has similar propagation characteristics to the 1850-2200 MHz band and comparable electronic equipment manufacturing costs. Moreover, it is INGAA's opinion that personal communications services and other emerging technologies could be accommodated more quickly in this band than under the plan offered in the Notice. Based on relevant licensing statistics, it would appear that the 2500-2690 MHz band could be cleared more quickly, and that the band-clearing process would affect less critical licensees.

INGAA's recommendation that the 2500-2690 MHz band should be designated as the reserve spectrum for accommodating emerging technologies is derived directly and immediately from the criteria set forth by the Commission in its NPRM. As outlined below, the 2500-2690 MHz band appears to meet all of the requirements imposed by the Commission.

a. Cost of Equipment

Since the 2500-2690 MHz band is below the 3 GHz ceiling identified by the FCC as a consideration, the cost of equipment development would be comparable to that of the 1850-2200 MHz band. The technical characteristics of the frequencies and performance of the equipment would be virtually identical. There would be no reason for delay in the introduction of new services using this band.

b. Amount of Spectrum

The 2500-2690 MHz band would allow contiguous use of 190 MHz, as compared with the three discrete frequency segments in the 1850-2200 MHz band proposed in the Notice. Combined with the government spectrum being considered for reallocation in the related proposed Congressional legislation, the 2500-2690 MHz band would be more than adequate to satisfy the emerging technology reserve requirements at this time and for the foreseeable future.

c. Feasibility of Relocation

From the standpoint of implementing emerging technologies, this is the most attractive feature of the 2500-2690 MHz band. The band is very lightly loaded, particularly when compared with 1850-2200 MHz. While there may be a substantial number of applications pending, relatively few have been granted and the available evidence suggests that the number of stations actually constructed is minimal. By comparison, as demonstrated in the OET Study, there are 29,116 fixed microwave facilities in the 1850-2200 MHz band. Therefore, the 2500-2690 MHz band could be cleared much more rapidly than the 1850-2200 MHz band.

The Commission has apparently already concluded that existing licensees in the 1850-2200 MHz band could be accommodated in higher frequency bands. In a similar way, any wireless cable and ITFS systems affected by the suggested reallocation of the 2500-2690 MHz band for emerging technologies could easily be accommodated in higher frequency bands, since the propagation characteristics of 1850-2200 MHz and 2500-2690 MHz are virtually the same. INGAA notes that the Commission has granted experimental licenses in New York City for wireless cable systems operating at frequencies as high as 28 GHz.

In its Notice, the Commission argued that the 2500-2690 MHz band should be excluded from consideration for emerging technologies due to the "more than 24,000 applications on file" for this band and the lack of alternative spectrum to accommodate existing systems and the pending applications. However, this argument ignores the fact that the Commission's proposal will require both the reallocation and rechannalization of existing bands to accommodate the 29,116 facilities already licensed in the 1850-2200 MHz band. The allocation of alternative spectrum for the relatively few wireless cable licensees and ITFS systems would seem to be far less complicated, disruptive or costly than the reaccommodation actions contemplated in the Proposed Rule.

d. Non-government Spectrum

The 2500-2690 MHz alternative satisfies the requirement that the spectrum to be designated for emerging technologies should not be used by the Federal Government.

e. International Developments

The only criterion relating to international considerations is that the emerging technologies reserve spectrum be located between 1 and 3 GHz. The 2500-2690 MHz band meets this need.

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In general, selection of the 2500-2690 MHz band to satisfy emerging technologies would be less disruptive and less costly than use of the 1850-2200 MHz band. As demonstrated above, with the 2500-2690 MHz band, there would be no problems in meeting each of the criteria set by the Commission. It would appear reasonable to conclude that preserving channels for private operational-fixed microwave systems needed for the safe and efficient operation of America's basic and vital industries would be far more important than the inconvenience of relocating a predominantly entertainment service to another frequency band. We believe that the 2500-2690 MHz band is a much better home for the "reserve spectrum" for emerging technologies and is the only logical choice available to the Commission, given the limiting factors the Commission is using to make its decision.

The Commission should be aware that its failure to fully investigate all available spectrum alternatives for emerging technologies could render the entire rulemaking proceeding unlawful under the Administrative Procedures Act (5 U.S.C. § 551). The APA directs that agency action shall be deemed unlawful if it is "arbitrary, capricious, an abuse of agency discretion, or otherwise not in accordance with law." (5 U.S.C. §706(2)(A)). To meet this standard, the Commission is required to scrutinize all reasonable alternatives to its chosen course of action. A court will "look carefully at the Commission's reasoning to ensure that all relevant factors and available alternatives were given adequate consideration in the course of the rulemaking proceedings." (*United Church of Christ* at 1426, See also, *Greater Boston Television Corp. v. FCC*, 444 F.2d 841, 850 (D.C. Cir. 1970), *cert. denied*, 403 U.S. 923 (1971)).

THE COMMISSION'S "PUBLIC INTEREST" ASSUMPTION IS FLAWED

On page 5 of its Notice, the Commission stated that "creation of emerging technologies bands would ...encourage the larger and more effective use of radio in the public interest." The Commission should know that it is required by Section 303(f) of the Communications Act of 1934 (47 U.S.C.S. 151 et seq.) to find that the "public interest" will be served by forcibly relocating existing licensees to different frequencies. While admittedly the "public interest" standard is not clearly defined in the statute or by case law, and the Commission must be afforded a great deal of deference in applying such standard, such discretion is not unlimited. In its proposal, the Commission is weighing the known, critical national interests of the existing licensees against the extremely speculative benefits to be gained from emerging technologies. It seems evident that there is simply no way the Commission can make a valid public interest evaluation in these circumstances. The Commission cannot show that the public interest will be served by simply assuming that the benefits to be gained from the new technologies will outweigh the burdens caused by the forced migration of current licensees to higher frequencies or other methods of communications. The Commission's assumption seems to be speculative at best and irresponsible at worst.

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It is INGAA's position that the reserve spectrum targeted in the Notice is being utilized effectively and in the best public interest as it is currently allocated. The proposed reallocation will impose a tremendous financial and manpower burden in order to satisfy an unknown need.

INGAA must, therefore, question the Commission's determination that an ill-defined and commercially unproven group of new technologies has spectrum needs of public interest which outweigh the value of goods and services provided the public by current users of that spectrum. To date, while the Commission has continued to tout its perception of an immediate spectrum need to accommodate emerging technologies, neither the Commission nor new technology proponents have made an empirical showing that a significant pent-up demand for these new services exists or will materialize in the near term. Moreover, should the Commission and/or new technology proponents be able to demonstrate such a demand, the nature of the proposed new services is "convenience oriented" and not vital to the public welfare and safety. INGAA asserts therefore, that the Commission's proposal is in violation of its special statutory obligation to allocate spectrum in a manner that promotes "the safety of life and property." (47 U.S.C. §151 et seq). While the Commission is not required to grant users with public safety responsibilities an absolute right to a particular spectrum home, it is clear that the statute requires the FCC to give such uses an allocation priority over services which are "purely commercial or which are more in the nature of a convenience or luxury." The Commission's proposal is based on inadequate analysis and erroneously assigns safety-oriented uses an unacceptably low allocation priority. Such action clearly violates the Commission's responsibilities mandated under the Communications Act.

**THE COMMISSION DID NOT GIVE
ADEQUATE CONSIDERATION TO ALTERNATIVES
FOR CURRENT SPECTRUM USERS**

On page 9 of the Notice, the Commission expressed its belief that the needs of displaced licensees may easily be accommodated by fixed microwave bands above 3 GHz and through fiber optics, satellite technology, or common carrier services.

The Commission's confidence in the viability of such "spectrum substitutes" is misplaced. Frequencies above the 3 GHz range will not provide the long-haul capabilities that assignments from the targeted spectrum bands offer. Although some of the paths operated in the targeted bands are not long distance, many long length paths now operate throughout the country in these bands since they provide optimal long distance, point-to-point, reliable transmission characteristics.

Because frequencies above 3 GHz do not exhibit those same transmission properties, replacement with higher range frequencies will require operators to implement thousands of

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additional "relay hops" in order to meet long distance transmission needs. The addition of every such "hop" further compromises the reliability of system communications because the possibility of outages increases dramatically with the imposition of every retransmission point.

Further, the "rights of way" which would be necessary to construct the additional "hop" sites are prohibitively expensive. This cost will artificially drive up the price of new technology services to the public since new technology operators will, and should, be responsible for reimbursing current operators for system conversion costs. Additionally, due to environmental regulations and/or refusals by property owners to give clearances, such rights of way will, in many cases, be practically impossible to obtain.

Of course, the cost of reconfiguring such systems will be considerably higher depending on the availability of frequencies, applicable interference criteria, possible tower structural work, and equipment changes. The transition would also require thousands of man-hours for engineering, design and construction, as well as increased operational and maintenance costs for additional equipment and sites that would not be necessary if current spectrum users are not forced to move. Our members estimate the cost to upgrade their existing microwave stations for relocation to higher frequencies and add new facilities will average approximately \$200,000 per station. Consequently, the total cost to upgrade all existing 2 GHz natural gas pipeline systems could easily exceed \$100 million.

In paragraph 17 of the Notice, the Commission states its belief that there are other reasonable alternatives to microwave for private communications systems. As discussed below, these alternatives are inadequate to provide the reliable long distance service now afforded our industry in the 2 GHz spectrum.

a. Fiber Optics Technology

If the Commission is referring to leased fiber capacity from common carriers, it should be noted that the majority of our member's facilities are located in rural areas where the fiber access is either extremely limited or non-existent. As a general rule, "right-of-way" type industries, such as pipeline or power transmission companies, tend to be located in remote or rural regions of the country where there is no need for high-capacity fiber. In such situations, private fiber is not cost-effective to install and operate due to the relatively small amount of bandwidth that is required at each facility and the distance between locations. Additionally, our member's prior experience with private cable systems has shown that they are susceptible to failure due to natural disasters and excavation-related construction, as well as due to pipeline failures and maintenance-related incidents where the cable is on the right-of-way.

The idea that fiber optic cables can be buried in gas pipeline system rights-of-way ignores important reliability and safety issues. The effects of a pipeline rupture may be massive, with large amounts of soil displaced. This may be coupled with intense heat in the event of a resulting fire. The likelihood of such a rupture severing companion signal cables is very high. In this event, control of critical equipment such as safety valves used to isolate the rupture would be lost at the time they are most critically needed.

In addition, heavy earth moving equipment is often used in rights-of-way to do construction and maintenance work. When such equipment is in use, it would be very difficult to protect vital communications cables. However, it is at such times that the pipelines are most vulnerable to damage and instantaneous data and control communications are most essential.

b. Satellite Systems

Satellite systems place common carriers and private industry in a position of "limited control" over critical operational systems. The reliability of satellite technology is dependent on the frequencies employed by the system. Additionally, the cost-effectiveness of "like" services using satellite is not at all comparable to the economic efficiency of the private microwave systems currently in use.

Furthermore, satellite systems do not provide acceptable substitute service since time delays inherent in signal relay through satellite systems compromise Supervisory Control and Data Acquisition (SCADA) system functions and cannot provide the "real time" monitoring and control that are essential to prevent the possibility of harm to the public.

c. Common Carrier Circuits

While the overall reliability of common carrier circuits have arguably improved in recent years, they are still subject to outages that are unacceptable for such critical control information. The remote location of many gas system facilities means that common carrier services are only available from small central offices using limited systems. These small central offices often have limited service capabilities and are not well equipped to provide adequate round-the-clock response to communications outages. The gas industry's experience with such circuits has generally been poor. This was one of the driving forces that caused natural gas pipeline companies to invest large amounts of capital to develop their own microwave systems.

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The use of common carrier circuits as a primary communications medium negates much of the alternate circuit routings developed to maintain high availability for these critical communications systems. Almost all pipeline companies use common carrier circuits as a back-up to critical private microwave circuits and for routine communications. Reliance on common carriers as the sole source would significantly increase the probability of a major disruption of circuits critical to safe gas system operations.

In reviewing the Commission's suggested alternatives, as discussed above, INGAA is concerned that reliance on such alternatives would place the vital monitoring and control systems of natural gas pipeline companies in the hands of commercial carriers. In times of outages, quick restoration of service to a pipeline monitoring system might not be a top priority of the pipeline company's carrier. Such service lapses and system unreliability could result in catastrophic consequences to the welfare and safety of the public.

**CLARIFICATION OF THE PRIMARY/CO-PRIMARY
AND SECONDARY STATUS IS NEEDED**

Under the planned grandfathering arrangement suggested in the Notice, private microwave and common carrier licensees of systems in the 2 GHz band would be subject, at the end of the ten to fifteen year grandfathering period, to immediate displacement by an encroaching new service. This arrangement will necessarily impose a great deal of uncertainty on existing licensees as to continued use of their systems. Consequently, there will be great pressure placed upon existing licensees to vacate the spectrum well before the grandfathering period expires.

If the emerging technologies really do enjoy the consumer demand that is anticipated by the Commission, then proponents of these services should have sufficient capital resources to successfully negotiate for the relocation of existing microwave systems. The ultimate relocation of microwave systems is one area in which INGAA strongly believes that the marketplace will be the most efficient mechanism for ensuring timely and efficient relocation of services. However, in order for the marketplace to work effectively, it is imperative that existing microwave system licensees be granted indefinite primary status. Otherwise, existing users will enjoy very little bargaining leverage as the end of the ten or fifteen year grandfathering period approaches. Further, existing users, particularly those in rural areas, will face considerable uncertainty regarding their continued use of the spectrum as the grandfathering period ends. The only reasonable resolution of this uncertainty is for the Commission to grant existing users indefinite primary status, thereby ensuring that all microwave users will have some control over the fate of their systems.

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INGAA believes it is imperative that private industry, at a minimum, share in the grandfathering status offered the local and state governments. Two critical points must be adhered to in this area: sharing should be based on current interference criteria and there should be no degradation of the existing operating environments. Private systems are no less critical and the financial/operational concerns of private industries are no less urgent than those of the local and state governments.

INGAA notes that the Commission's Notice made no provision for modification of grandfathered stations or assignments and transfer of these facilities. Should the Commission not formally permit certain modifications to systems, licensees will jeopardize their primary status simply by making relatively innocuous changes to a station. The Commission has rectified this omission, to a certain extent, with its Public Notice of May 14, 1992 on the subject of "Two Gigahertz Fixed Microwave Licensing Policy." In this Public Notice, the Commission stated that a number of changes, including changes in ownership and control of stations, can be made by licensees without jeopardizing the primary status of the system. INGAA believes the changes specified in this Public Notice are appropriate and urges the Commission, when adopting final rules in this proceeding, to specifically provide the flexibility for licensees to make such changes without jeopardizing primary status.

CONCLUSION

INGAA recommends that the developers of new radio services not be given operations frequencies until they have demonstrated technically functional systems serving a strong market need. Large blocks of spectrum are too valuable to existing users to be widely distributed to developers of unproven systems with unknown market demand. The example set in the development of the cellular telephone, where very limited systems using very little spectrum proved out both techniques and market demand before allocation, should be followed by the Commission. The example set in the allocation of 500 MHz of spectrum at 12 GHz for Direct Broadcast Satellite, where systems are still not developed nor demand proven after almost ten years, should be avoided.

The fact that the Commission has received requests and applications for experimental licenses does not equate to a public need for these undefined emerging technologies. In fact, the cellular and cable industries have indicated that they already have the capability to provide emerging technologies without the need for band reallocation. (UTC comments, *En Banc* Hearing on PR Docket No. 90-314). Consequently, INGAA is convinced that the Commission has not provided sufficient proof of the "public interest" required by the Communications Act to force current 1850 to 2200 MHz microwave spectrum users to move to alternative spectrum or methods of telecommunications.

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INGAA's members provide a vital national service that requires an extremely reliable and responsive communication network. We urge the Commission to seek a better method of promoting emerging technologies which will benefit equally the existing licensees, emerging technologies, and the public.

INGAA appreciates being given the opportunity to provide comments on this subject of vital interest to our industry.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Theodore L. Kinne', with a large, stylized initial 'T'.

Theodore L. Kinne
Vice President
Environment, Safety & Operations

TLK/jda

cc: George Tenley, DOT
John Williams, DOE
Chairman Martin Allday, FERC